Transportation Safety Board of Canada

Bureau de la sécurité des transports du Canada

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Our file Notre reference

28 November 1990

The Honourable Doug Lewis, P.C., Q.C., M.P.
Minister of Transport
Place de Ville
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Ottawa, Ontario
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Honourable Minister:

Following the introduction of measures to phase out smoking in Canadian aircraft, we began to receive reports through the Confidential Aviation Safety Reporting Program of a new problem. These reports plus information supplied by ATAC indicate that significant numbers of aircraft occupants are now smoking in the washrooms. They are, in some cases, disabling smoke detectors and otherwise misusing washroom equipment. If smoking materials are disposed of in waste bins they increase the risk of an in-flight fire. If flush pump motors are run continuously the risk of an overheated motor arises. If the smoke detectors are disabled, the chances of early detection of a fire are reduced. The reports of smoking in the washrooms are not isolated; there are hundreds of cases.

The attached aviation safety recommendations address this problem by proposing the modification of existing aircraft smoke detection systems, the development of a public awareness program to sensitize aircraft

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occupants to the hazards of smoking in aircraft lavatories, and the collection of information related to incidents of willful decommissioning of smoke detectors.

The Transportation Safety Board of Canada looks forward to your reply to these recommendations.

Yours sincerely,

John W. Stants
Chairman

Enclosures

cc: Assistant Deputy Minister - Aviation Group (TC)
Director, Aviation Safety Programs (TC)
Director General, Public Affairs (TC)

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AVIATION SAFETY RECOMMENDATIONS

CTAISB A90-61, 90-62, 90-63 and 90-64

DATE ISSUED: 28 November 1990

FORWARDED TO:

The Honourable Doug Lewis, P.C., Q.C., M.P.
Minister of Transport

Background

In the past ten years there have been a number of tragic cabin fires in Transport category aircraft. As a result there have been a number of safety initiatives in this area, ranging from the 'fire-hardening' of aircraft interiors, to research into methods by which passengers and crew can be protected from the debilitating effects of smoke. An effective fire detection system is an integral part of reducing the probability of a major onboard fire; to this end, Canadian-registered aircraft of more than 12,500 lbs and engaged in commercial operations must be equipped with fire detection and prevention equipment in accordance with Air Navigation Order Series II, No. 30 (The Airplane Cabin Fire Protection Order).

Canada has been a world-leader in introducing legislation prohibiting smoking on aircraft. Although the regulations were intended to enhance health conditions in the workplace for employees and the flying public, they were also seen as potentially beneficial from the cabin fire prevention standpoint. Theoretically, a reduction in the use of such combustible materials as cigarettes on board aircraft would also reduce the probability of an onboard fire. On September 10, 1987, an amendment to the Air Regulations was published in Part II of the Canada Gazette which announced the prohibition of smoking on flights originating in Canada with a duration of two hours or less. This was followed in 1988 by the Non-smokers' Health Act and in 1989 by the Non-smokers' Health Regulations, which

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prohibited smoking on almost all commercial flights conducted by Canadian air carriers. International flights of more than six hours duration were exempted; however, an amendment to the Regulations passed on June 8, 1990 introduced a schedule which would ban smoking on even these flights by July 1, 1993. By these measures, there can be little doubt that the Health Act and Regulations will meet the health objectives; regrettably, there have been indications that the legislation may, in some situations, actually be increasing the possibility of an onboard fire.

The Board's examination of illicit smoking in aircraft has assumed that the regulatory prohibitions to smoking will remain. Nicotine addiction holds a powerful influence on many smokers. Although it might be possible to accommodate smokers by innovations such as providing sealed and independently-vented smoking compartments, the Board did not attempt to assess the feasibility of such options. The following Recommendations address the safety deficiencies only in the context of the presently-prescribed Aeronautics Act and the Non-smokers' Health Act.

Smoke Detection Systems

The CTAISB has analyzed a number of incidents in which passengers disabled smoke detection equipment in aircraft lavatories in order to smoke illicitly. Such tampering with the safety equipment of passenger-carrying aircraft places all the occupants of the aircraft at risk if a subsequent fire should occur. Moreover, smoking in an aircraft lavatory which is not equipped with ashtrays and which contains flammable paper products in dispensers and waste bins increases the risk of an onboard fire starting.

As of September 1990, there have been no reported occurrences involving Canadian aircraft in which an onboard fire resulted from smoking on aircraft. (There was some suspicion that the catastrophic Air Canada DC-9 fire of 2 June 1983 may have been started by smoking materials, but there was no substantiating evidence for this theory.) However, the Confidential Aviation Safety Reporting Program of the former CASB had received 12 reports regarding illicit smoking on board aircraft. After receiving several reports of passengers having deactivated smoke detectors in aircraft lavatories, the CASB issued an Aviation

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Safety Advisory on January 18, 1989 which suggested the need for "more stringent specifications for smoke detection systems in aircraft lavatories". Transport Canada advised that they were reviewing the relevant Air Navigation Order, but no formal response to this Safety Advisory has yet been received.

On June 15, 1990, the Air Transport Association of Canada (ATAC) expressed concern to officials of the CTAISB regarding "the number of occurrences where passengers disregard the safety rules by smoking in aircraft lavatories during flights on which smoking is prohibited". They cited information recorded by two major airlines in which there were 330 incidents during 1989 and the first three months of 1990. On at least 57 of the 330 occurrences reported by the two airlines, passengers had tampered with the smoke detection system. In some instances in which the detector was not sealed, passengers were able to decommission the detector by removing the battery. In other cases in which the smoke detectors were sealed units, passengers covered the sensors with such items as shower caps. Passengers have also attempted to avoid detection by venting the lavatory through the continuous flushing of the toilet or by the constant draining of wash basin water. These latter tactics could pose additional hazards through the overheating of motors not designed for extended operation. (An overheated flush pump motor was another of the possible causes of the June 1983 Air Canada DC-9 accident.)

The information supplied by ATAC reinforces the need - originally expressed in January 1989 by the former CASB - for improved smoke or fire detection systems on passenger-carrying aircraft. Alternative systems which would hinder or preclude passenger interference could include concealed smoke-activated detectors, or infra-red detection systems. Accordingly, the Board recommends that:

> Transport Canada develop specifications for smoke detection systems which will make smoke detectors less vulnerable to passenger interference.
>
> (CTAISB A90-61)

Few incidents reported by ATAC of known illicit smoking in aircraft lavatories resulted in the activation of the aircraft's smoke detection system: one company reported that smoke detector activation led to a warning of onboard smoking in only 30 of 149

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occurrences (20%) of known illicit smoking. The many instances in which the smoke detectors failed to warn of the presence of smoke in lavatories, especially when there was no evidence of tampering, suggest that the lavatory smoke detection systems presently on aircraft do not function consistently.

Transport Canada has not created a specific technical standard for smoke detection systems in aircraft lavatories. Regrettably, the data available to the CTAISB do not indicate whether the malfunctioning detection systems which had not been disabled failed due to problems of design, material, installation, or maintenance. However, an examination of the Safety Deficiency Reporting (SDR) System maintained by Transport Canada and the Federal Aviation Administration (FAA) of the United States reveals that smoke detection systems on aircraft operating in North America malfunction regularly, reinforcing observations made from the ATAC data that the detection systems may often be ineffective.

A reliable smoke detection system is one of the primary means by which an onboard fire originating in the cabin of a passenger-carrying aircraft can be detected. The effectiveness of legislation requiring the carriage of fire detection equipment is undermined if the equipment fails to function consistently. In the absence of specific technical data, the Board cannot recommend detailed remedial action. Accordingly, the Board recommends that:

> The Department of Transport determine the causes for the reported poor activation rate of aircraft smoke detection equipment and take appropriate remedial action to enhance the effectiveness of onboard smoke detection equipment.
>
> (CTAISB A90-62)

Public Awareness Programs

There is no absence of information pertaining to the smoking restrictions on aircraft. The Non-smokers' Health Regulations and the Air Regulations specify the types of notices which must be posted in the aircraft, and cabin crew include information regarding the prohibition of smoking in briefings to the passengers. It is thus likely that smokers are consciously

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deciding to ignore the regulations and that simply drawing the provisions of the regulations to their attention is ineffective. Smoking passengers must be motivated to alter their behaviour, either because they recognize the possible safety consequences of their actions, or because they are deterred by the possibility of severe punitive measures.

One report received by the Confidential Aviation Safety Reporting Program described a smoker's remorse after the Flight Attendant advised him of the safety ramifications of disabling the lavatory smoke detection system. It is likely that widespread promotion of the hazards of smoking in concealed locations in the aircraft would influence at least some smoking passengers to act in a more responsible manner. Moreover, widespread awareness by non-smoking passengers that the actions of illicit smokers expose everyone to a higher risk of onboard fires would likely result in more active reporting of incidents in which tampering with the smoke-detection equipment was suspected.

Officials from the airlines can, and do, help to deter illicit smoking; they are in daily contact with the fare-paying passenger, particularly just before and during the flight when a safety message is most effectively conveyed. However, a concurrent, promotional campaign would enhance awareness of flightcrew and the flying public of the hazards of illicit smoking on aircraft. The Board believes that a joint promotional undertaking by officials from Transport Canada and representatives of the aviation industry would be more desirable and more effective than increased regulatory enforcement to resolve the safety problem of illicit onboard smoking. It understands that just such a promotional campaign is being planned by Transport Canada, in cooperation with ATAC, but that the timing and/or scope may be adversely affected by resource constraints. Accordingly, the Board recommends that:

> The Department of Transport, in conjunction with industry representatives, proceed as quickly as possible with a safety promotional campaign to enhance the awareness of passengers and crew members of the risks of smoking in aircraft lavatories.
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> (CTAISB A90-63)

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Occurrence Data

The CTAISB database from transportation occurrences contained little information regarding these deficiencies. No accident has been conclusively linked to onboard smoking, and the criteria for mandatory reporting of aviation occurrences do not include incidents in which smoke-detectors have been decommissioned. Fortunately, the Confidential Aviation Safety Reporting Program contained information on this issue, which coupled with the material received from ATAC and the correspondence received directly from several operators, permitted deficiency analysis to be conducted.

ATAC's initiative in collecting safety-related information pertaining to the tampering of smoke detectors is commendable. However, the quality of information collected by different companies varied greatly, making deficiency analysis difficult. Industry, Transport Canada, and the Transportation Safety Board, lacking accurate and timely information regarding smoke detectors which have been wilfully decommissioned, will be hampered in the identification and resolution of safety deficiencies. Accordingly, in addition to the information which Transport Canada presently collects regarding technical malfunctions of smoke detectors, the Board recommends that:

> Transport Canada gather information on incidents involving aircraft governed by Air Navigation Order Series VII, No. 2 in which lavatory smoke detection systems did not function due to passenger interference.

(CTAISB A90-64)

John W. Stants
Chairman
On behalf of the Board